

Claims

1. (Currently amended) A positioning information distribution system comprising:

an information processing station connected to and accessible via a data network, said information processing station having a database for storing navigation information regarding satellites in a positioning system and differential correction data;

a plurality of receiving stations each including a positioning system receiver and a transmitter, said positioning system receiver receiving navigational messages from one or more of said satellites in said positioning system, calculating differential correction data relative to its own position, and transmitting said differential correction data and said navigation information extracted from the navigational messages to said information processing station via a data link for storage at said database; and

a mobile unit including a positioning system receiver and a data processing unit, said mobile unit receiving positioning signals from a subset of satellites being in line-of-sight of said mobile unit and communicating with said data network using wireless communication, wherein said mobile unit processes said positioning signals and said navigation information and differential correction data obtained from said information processing station over said data network to compute a measured position of said mobile unit.

2. (Canceled).

3. (Previously presented) The system of claim 1, wherein said positioning system

is a global positioning system (GPS), said positioning system receiver is a GPS receiver and said navigation information is GPS satellite information.

4. (Canceled).

5. (Previously presented) The system of claim 3 1, wherein said information processing station distributes said satellite information by broadcasting said satellite information through said data network; and said mobile unit receives said broadcast satellite information through wireless communication.

6. (Previously presented) The system of claim 3, wherein said information processing station distributes said satellite information upon request from said mobile unit and transmits said satellite information through said data network to said mobile unit using wireless communication.

7. (Original) The system of claim 3, wherein said satellite information comprises ephemeris information defining the orbital parameters of said GPS satellites.

8-9. (Canceled)

10. (Previously presented) The system of claim 3, wherein said satellite information comprises satellite health information of said GPS satellites.

11. (Previously presented) The system of claim 10, wherein said data processing unit discards satellite information received for a first one of said GPS satellites when said satellite health information for said first one of said GPS satellites indicates a malfunctioning status.

12. (Previously presented) The system of claim 3, wherein said satellite

information comprises satellite almanac information of said GPS satellites.

13. (Previously presented) The system of claim 12, wherein said data processing unit provides said satellite almanac information received from said information processing station via said data network to assist in searching for one or more of said GPS satellites above the horizon.

14. (Original) The system of claim 3, wherein said satellite information comprises satellite clock correction factors of said GPS satellites.

15. (Original) The system of claim 3, wherein said satellite information comprises one or more of the following information: the actual navigation bits of the navigation message transmitted by said GPS satellites, the Doppler shifts information for said GPS satellites, and time and frequency information for synchronizing a clock of said mobile unit to a GPS time.

16. (Canceled).

17. (Currently amended) The system of Claim [[16]] 1, wherein said data processing unit receives said satellite information and said differential correction data from said information processing station via said data network.

18. (Previously presented) The system of claim 3, wherein said receiving stations are stationary.

19. (Previously presented) The system of claim 3, wherein said receiving stations are is in direct line-of-sight of one or more GPS satellites continuously and substantially uninterrupted.

20. (Original) The system of claim 3, wherein said data link is a wireless data

communication link.

21. (Original) The system of claim 3, wherein said data link is a direct wired link.

22. (Original) The system of claim 21, wherein said data link is a T1 data link.

23. (Original) The system of claim 3, wherein said data link is a communication data link through said data network.

24. (Original) The system of claim 3, further comprising:

a wireless network gateway connected to said data network, said gateway providing wireless communication service to said mobile unit;

wherein said mobile unit communicates over a wireless data communication link with said gateway for receiving information from said data network.

25. (Original) The system of claim 24, wherein said wireless communication service comprises communicating using a packet data structure.

26. (Original) The system of claim 24, wherein said wireless communication service comprises communication via a cellular telephone modem.

27. (Original) The system of claim 26, wherein said wireless communication service uses a short message service of a cellular communication structure.

28. (Original) The system of claim 24, wherein said wireless communication service comprises communication over a satellite data link.

29. (Original) The system of claim 3, wherein said data network comprises a publicly shared network such as the Internet.

30. (Previously presented) The system of claim 3, wherein said further comprising:

a data processing station connected to said data network and having access to a database including maps.

31. (Original) The system of claim 30, wherein said data processing station provides area maps to said mobile unit based on said measured position of said mobile unit.

32. (Original) The system of claim 30, wherein said data processing station provides travel-related information to said mobile unit based on said measured position of said mobile unit.

33. (Original) The system of claim 3, wherein said mobile unit is a cell phone and said information processing station broadcasts said satellite information to said cell phone.

34. (Original) The system of claim 33, wherein a user of said mobile unit places a 911 call using said cell phone and determines its position using said broadcast satellite information from said information processing station.

35. (Original) The system of claim 33, wherein a user of said mobile unit obtains location-dependent information using said cell phone.

36. (Currently amended) A GPS satellite information distribution system comprising:

an information processing station connected to and accessible via a data network, said information processing station having a database for storing GPS satellite information and differential correction data;

a plurality of receiving stations, each including a global positioning system

(GPS) receiver and a transmitter, said GPS receiver extracting said GPS satellite information from navigational messages from GPS satellites, calculating differential correction data relative to its own position, and transmitting said differential correction data and said GPS satellite information to said information processing station via a data link for storage at said database; and

a mobile unit including a GPS receiver and a wireless communicator, said mobile unit receiving said GPS satellite information and said differential correction data from said information processing station via said data network and GPS positioning signals from said GPS satellites through said GPS receiver to compute a measured position of said mobile unit.

37. (Original) The system of claim 36, wherein said plurality of receiving stations are disposed to receive GPS satellite information from all of 24 GPS satellites in earth's orbit.

38. (Original) The system of claim 36, wherein each of said GPS satellites is observed by at least two of said plurality of receiving stations.

39. (Previously presented) The system of claim 36, wherein said mobile unit receives time of arrival information from at least three GPS satellites.

40. (Original) The system of claim 36, wherein said information processing station distributes said satellite information by broadcasting said satellite information through said data network; and said mobile unit receives said broadcast satellite information through wireless communication.

41. (Original) The system of claim 36, wherein said mobile unit further comprises a wireless transmitter; and said information processing station distributes said satellite

information upon request from said mobile unit and transmits said satellite information through said data network to said mobile unit using wireless communication.

42. (Original) The system of claim 36, wherein said satellite information comprises ephemeris information defining the orbital parameters of said GPS satellites.

43. (Currently amended) The system of claim 42, wherein said mobile unit receives time of arrival information from at least three GPS satellites.

44. (Original) The system of claim 36, wherein said satellite information comprises one or more navigation messages transmitted by said GPS satellites.

45. (Original) The system of claim 44, wherein said satellite information comprises satellite health information of said GPS satellites.

46. (Original) The system of claim 45, wherein said mobile unit discards satellite information received for a first one of said GPS satellites when said satellite health information for said first one of said GPS satellites indicates a malfunctioning status.

47. (Original) The system of claim 44, wherein said satellite information comprises satellite almanac information of said GPS satellites.

48. (Original) The system of claim 47, wherein said mobile unit uses said satellite almanac information received from said information processing station via said data network for locating one or more of said GPS satellites above the horizon.

49. (Original) The system of claim 36, wherein said satellite information comprises satellite clock correction factors of said GPS satellites.

50. (Original) The system of claim 36, wherein said satellite information

comprises one or more of the following information: the actual navigation bits of the navigation message transmitted by said GPS satellites, the Doppler shifts information for said GPS satellites, and time and frequency information for synchronizing a clock of said mobile unit to a GPS time.

51. (Canceled).

52. (Currently amended) The system of claim ~~[[51]]~~ 36, wherein said mobile unit receives time of arrival information from at least three GPS satellites.

53. (Original) The system of claim 36, wherein said plurality of receiving stations are in direct line-of-sight of one or more GPS satellites continuously and substantially uninterrupted.

54. (Original) The system of claim 36, wherein said data link is a wireless data communication link.

55. (Original) The system of claim 36, wherein said data link is a direct wired link.

56. (Original) The system of claim 55, wherein said data link is a T1 data link.

57. (Original) The system of claim 36, wherein said data link is a communication data link through said data network.

58. (Original) The system of claim 36, wherein said data network comprises a publicly shared network such as the Internet.

59. (Currently amended) A method for distributing global positional system (GPS) satellite information over a data network to a mobile unit, comprising:

receiving in a plurality of receiving stations GPS signals transmitted by GPS satellites and extracting from said GPS signals GPS satellite information that is embedded in navigational messages of said GPS signals;

in each receiving station, calculating differential correction data relative to the position of the receiving station;

transmitting said GPS satellite information and said differential data to an information processing station through a data network and storing said GPS satellite information in a database accessible by said information processing station for later retrieval, said database storing also differential correction data; and

communicating said GPS satellite information and said differential correction data to a mobile unit through a wireless data link to said data network, wherein said mobile unit uses said GPS satellite information and said differential correction data in conjunction with GPS signals of three or more GPS satellites to determine a measured position of said mobile unit.

60. (Previously presented) The method of claim 59, wherein said mobile unit determines a time of arrival information based on each of said GPS signals of said three or more GPS satellites.

61. (Previously presented) The method of claim 59, wherein said information processing station said satellite information through said data network.

62. (Previously presented) The method of claim 59, wherein said GPS satellite information is provided to said mobile unit upon said mobile unit sending a request to said information processing station.

63. (canceled)

64. (Previously presented) The method of claim 59, wherein said plurality of receiving stations receive GPS satellite information from all of 24 GPS satellites in earth orbit.

65. (Previously presented) The method of claim 59, wherein each of said GPS satellites is observed by at least two of said plurality of receiving stations.

66. (Original) The method of claim 59, wherein said satellite information comprises ephemeris information defining the orbital parameters of said GPS satellites.

67. (Previously presented) The method of claim 66, wherein said mobile unit determines a time of arrival information based on each of said GPS signals of said three or more GPS satellites.

68. (Original) The method of claim 59, wherein said satellite information comprises one or more navigation messages transmitted by said GPS satellites.

69. (Original) The method of claim 68, wherein said satellite information comprises satellite health information of said GPS satellites.

70. (Original) The method of claim 69, further comprising:

receiving in said mobile unit said satellite health information transmitted by said information processing station for a first one of said GPS satellites; and

discarding satellite information received in said mobile unit for said first one of said GPS satellites when said satellite health information indicates said first one of said GPS satellites to be malfunctioning.

71. (Original) The method of claim 68, wherein said satellite information comprises satellite almanac information of said GPS satellites.

72. (Original) The method of claim 71, further comprising:

receiving in said mobile unit said satellite almanac information transmitted by said information processing station; and

locating in said mobile unit a first one of said GPS satellites above the horizon of said mobile unit based on said satellite almanac information.

73. (Original) The method of claim 59, wherein said satellite information comprises satellite clock correction factors of said GPS satellites,

74. (Original) The method of claim 59, wherein said satellite information comprises one or more of the following information: the actual navigation bits of the navigation message transmitted by said GPS satellites, the Doppler shifts information for said GPS satellites, and time and frequency information for synchronizing a clock of said mobile unit to a GPS time.